

(2.) *Division with a Constant Divisor.*

$\frac{d}{C} = x, \frac{d'}{C} = x', \frac{d''}{C} = x'', \&c.$ , may be resolved into

$$\left(\frac{C}{1}\right) = \frac{d}{x} = \frac{d'}{x'} = \frac{d''}{x''} = \&c.,$$

i.e.  $(\log. C - \log. 1) = \log. d - \log. x = \log. d' - \log. x' = \&c.$

This resolves the operations into questions of proportion. If, therefore, in the first example, the indices be so arranged that 1 on the scale is opposite the *movable* index, and *C* opposite the *fixed* index, the ratio  $\frac{1}{C}$  will be represented, logarithmically, by the distance between the two indices; and as this ratio is the same for all the other ratios, viz.,  $\frac{d}{x}, \frac{d'}{x'}, \frac{d''}{x''}, \&c.$ , it will be only necessary to bring the various values, *d, d', d'', &c.*, to the *movable* index, and the results, viz., *x, x', x'', &c.*, may be read off, in turn, at the *fixed* index. In like manner, in the second example, the *fixed* index is set at 1, and the *movable* index at *C*; and then the scale is moved so as to bring the different values—*d, d', d'', &c.*—to the *movable* index, when the answers—*x, x', x'', &c.*—will be found at the *fixed* index.\*

ART. X.—*Note on the Habits of Hermit Crabs.*

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A STATEMENT is constantly repeated in the text-books of zoology that the hermit crabs always protect their soft abdomens by taking up their abode in the *empty* shells of gasteropods. Thus Nicholson says: "The animal is compelled to protect the defenceless part of the body in some

\* It is stated (in a footnote) in the Instructions issued with the Rule that the two stops, which were fixed to the instruments first made, so that the beginning of the scale (100) might be brought at once to the fixed index, are now omitted as useless; but this is to be regretted, as, from the second set of examples shown above, it will be seen that such stops will prove of great advantage.

artificial manner, and this it effects by appropriating the *empty shell of some dead mollusc*, such as the common periwinkle or whelk."

Huxley (*Anat. Invertebrated Animals*, p. 340) says: "It is by means of these (claspers) that the hermit crab retains firm hold of the columella of the *empty* gasteropod shell, into which it is his habit to thrust his unprotected abdomen, and, covering over his retracted body with the enlarged chela, which takes the place of an operculum, resists all attempts at forcible extraction."

Even Van Beneden, the specialist on parasites and mess-mates, writes (*An. Parasites*, p. 24): "The shells which give them shelter are *such as have been shed*,\* which they find at the bottom of the sea, and in which they conceal their weakness and their misery."

At Portarlington I lately obtained a soldier or hermit crab (*Clibanarius barbatus*, Heller), occupying a full-grown shell of *Phasianella Tritonis*, which appeared quite fresh in its colour, and very unlike a shed and rubbed specimen, such as one does find among the rocks of the seabed. I placed the soldier in his shell, in a large bottle of water, in company with a living *Fasciolaria coronata* of about the same size as the pheasant shell. In about an hour the crab seemed to have inspected his companion, and to have coveted his abode, for from that time his busy claws were at work restlessly all the following evening and night, tugging at the operculum of the whelk. The bottle was in my bedroom, and I lay awake at times listening to the scuffle. In the morning the crab was found seated at his ease in the whelk's shell, while the torn fresh fragments of the foot and head of the latter were evidence in the bottle of his forcible piecemeal ejection. It was quite clear that in this instance at least the hermit had not by any means waited until the shell it desired was empty. Nor is it likely that this is a solitary case. I believe that the pheasant shell had been acquired from a living animal. My brother, Dr. Lucas, informs me that, in a recent visit to Northern Queensland, he noted that the appearance of the tenements of the tropical hermit crabs was more often that of fresh than of dead shells.

Without denying that the hermits may content themselves with empty shells which may suit their convenience (for

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\* The italics are mine.

this has often been observed), it is plain that they have also the power to take them from living occupants in certain cases. It is, I think, not a tenable hypothesis that the members of the equi-chelate genera are alone capable of such high-handed procedure. That the hermit crabs limit themselves to empty shells is a statement which, once made, has probably been handed down in the text-books, without verification, as a sort of tradition.

I may remark that the hermit crab (*Clibanarius barbatus*) which furnished this interesting observation has not been recorded before from Australia. It was described and figured by Dr. Heller as a New Zealand species in the *Voyage of the "Novara,"* 1865.\* The distinguishing peculiarities are the equal chelæ, which, with the second and third pairs of legs, are densely pilose; the long slender eyes reaching beyond the peduncles of the antennæ; and the smooth gastric region of the carapace, rounded in front, narrowed and truncate behind.

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\* Crustacea, p. 90, pl. vii., fig. 5.

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